

**NOISE  
ELEMENT  
1993**



Prepared by  
Merced City Planning  
Department  
Merced, California

# TABLE OF CONTENTS

## CITY OF MERCED

### CITY COUNCIL

James R. Lindsey, Mayor  
Richard Bernasconi, Mayor Pro Tempore  
Donald Bergman  
David Dias  
Frank "Flip" Hassett  
Mary Jo Knudsen

James G. Marshall, City Manager

Craig Smith, Executive Officer

### PLANNING COMMISSION

Barbara Sullivan, Chairperson  
Cynthia E. Garcia, Vice-Chairperson  
Lee Andersen  
George Hinds  
Kay Melanson  
Greg Spurgeon  
Barbara Stoddard-Schmit

### PLANNING DEPARTMENT

Philip W. Block, Community Development Director

### REPORT PREPARATION

Robert Diplock, Principal Planner  
Marta L. Soza, Planner  
Masoud Niroumand, Planning Technician II  
Nobie Neugebauer, Data Processing Technician



# TABLE OF CONTENTS

---

## SECTION I: INTRODUCTION

- A. Scope of the Noise Element
- B. Noise Sources and Noise Abatement Techniques
- C. Definitions


## SECTION II: GOALS/POLICIES/ACTIONS

## SECTION III: MAJOR SOURCES OF NOISE IN THE CITY OF MERCED

- A. Vehicular
- B. Rail Traffic Noise
- C. Aircraft Noise
- D. Other Sources of Noise
- E. Noise Sensitive Land Uses

## APPENDICES (Separate Document)

- A. Basic Characteristics of Noise
- B. Psychological and Physiological Effects of Noise
- C. Social and Economic Effects of Noise
- D. Noise Pollution Standards (Federal, State, and Local)
- E. Noise Contour Lines Computations



Digitized by the Internet Archive  
in 2025 with funding from  
State of California and California State Library

<https://archive.org/details/C124907847>

# NOISE ELEMENT

---

## SECTION I

### INTRODUCTION

The main purpose of the Noise Element is to identify noisy areas and to provide measures for protecting residents from the harmful effects of excessive noise. The Noise Element is based on an analysis of current and projected noise levels for streets and highways, railroads, and airports. Existing noise-sensitive land uses such as hospitals, rest homes, schools, and long-term medical care facilities are identified and a set of City policies are established to deal with excessive noise.

#### *A. Scope of the Noise Element*

The Noise Element provides a systematic approach to: (1) The measurement and modeling of noise; (2) the establishment of noise standards; (3) the control of major noise sources; (4) community planning for the regulation of noise; and, (5) the achievement of land use compatibility through the adoption of specific policies with respect to noise.

Existing and projected noise contours for all major sources of noise in the City of Merced have been mapped (Figures 1a and 1b). These noise contours are used as a guide for establishing land use patterns in the Land Use Element that minimizes the exposure of community residents to excessive noise. The Noise Element also includes policies and implementation measures that address existing and any foreseeable noise problems.

#### *B. Noise Sources and Noise Abatement Techniques*

Cars and trucks, aircraft, and trains are the most pervasive outdoor residential noise sources. Several approaches can be taken to lower the impact of noise from all the previously-mentioned sources. Barriers can be used to provide some attenuation. The amount of noise reduction depends upon the material and design of the barrier. Solid structures provide the most attenuation; vegetation will only abate noise a little, but psychologically can provide a more relaxed environment (see Figure 2a). An intervening row of buildings will decrease the amount of noise reaching more distant property.

#### *Reducing Vehicle Noise*

At the source, vehicular noise can be lowered through enforcement of noise level regulations, and if federal or state legislation provided the

proper incentives, quieter vehicles can be produced. Reducing traffic speed can also reduce noise output.

Measures that eliminate stop-and-go traffic help to reduce noise levels. To a certain extent, grade separations will do this, although increased acceleration of trucks will minimize the benefits. Wider rights-of-way and increased setbacks can reduce the possible impact on adjacent land uses (see Figure 2b). Recessing or elevating the roadway also reduces noise levels on adjacent property.

#### *Reducing Train Noise*

Like vehicular traffic, trains produce a linear noise pattern. Noise attenuation measures used to abate noise along highways also can be used along railways. Other noise-reduction methods include reducing the speed of the train, improving rail connections, and limiting night-time traffic.

#### *Reducing Aircraft Noise*

Noise from aircraft radiates in all directions so building noise barriers is not effective. It is possible to insulate buildings to achieve an acceptable interior noise level, and changes are being made to reduce aircraft noise at the source. In many cases, it is possible to modify flight patterns, take-off and landing techniques, or flight schedules. However, noise from military air bases presents a special problem. Military aircraft are noisier and it is difficult (or dangerous) to modify flight patterns or landing and take-off procedures for training flights.

The most effective means for reducing the impact of aircraft noise is to prohibit noise-sensitive uses in high noise areas through land use planning and zoning. Effective land use controls should be initiated early to minimize the level of development in areas impacted by aircraft noise.

#### *Castle Air Force Base*

In the Merced situation, high aircraft noise levels appear to have developed, not so much from incremental land use decisions, as from the initial relationship of an airport facility to an existing community. Expansion of the Castle Air Force Base during wartime conditions, along with the continual changes in air base mission and advancements in aircraft technology, have led to higher noise impact levels.

Under such circumstances, it would not be surprising if most areas residents respond to the question of the area's noise problem by pointing out how the community has lived and grown with aircraft noise for many years, developing into a stable, quality community. The recent announcement of the Castle Air Force Base closure will mean lower noise levels for the City of Merced, depending on the type of use to take over the facility in the future.

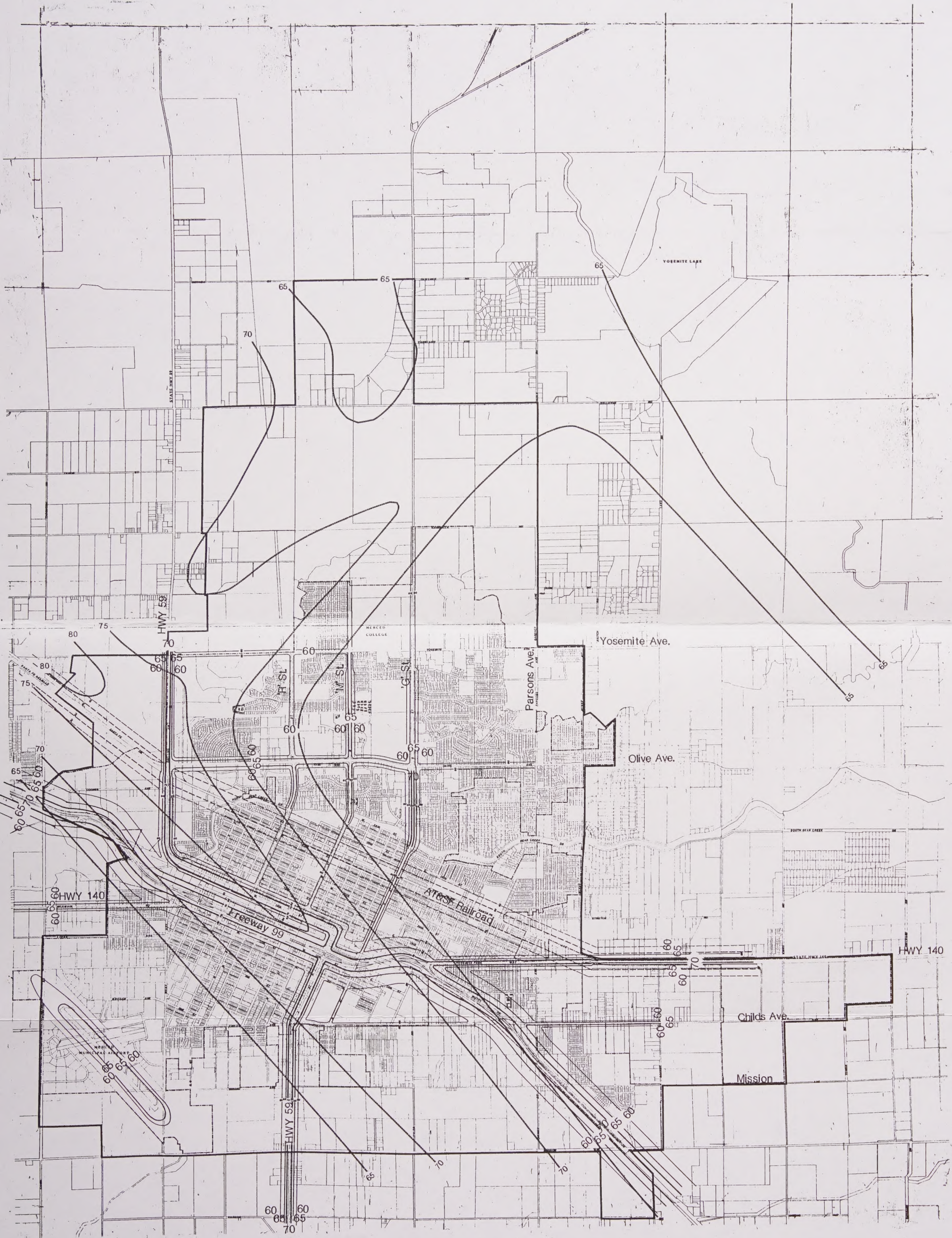


FIGURE 1A

EXISTING NOISE CONTOURS

CITY OF MERCED

NOISE ELEMENT



CITY OF MERCED  
PLANNING DEPT.







FIGURE 1B

## PROJECTED NOISE CONTOURS

- AIRCRAFT & VEHICULAR NOISE CONTOUR LINE
- - - RAILROAD NOISE CONTOUR LINE

## NOISE ELEMENT

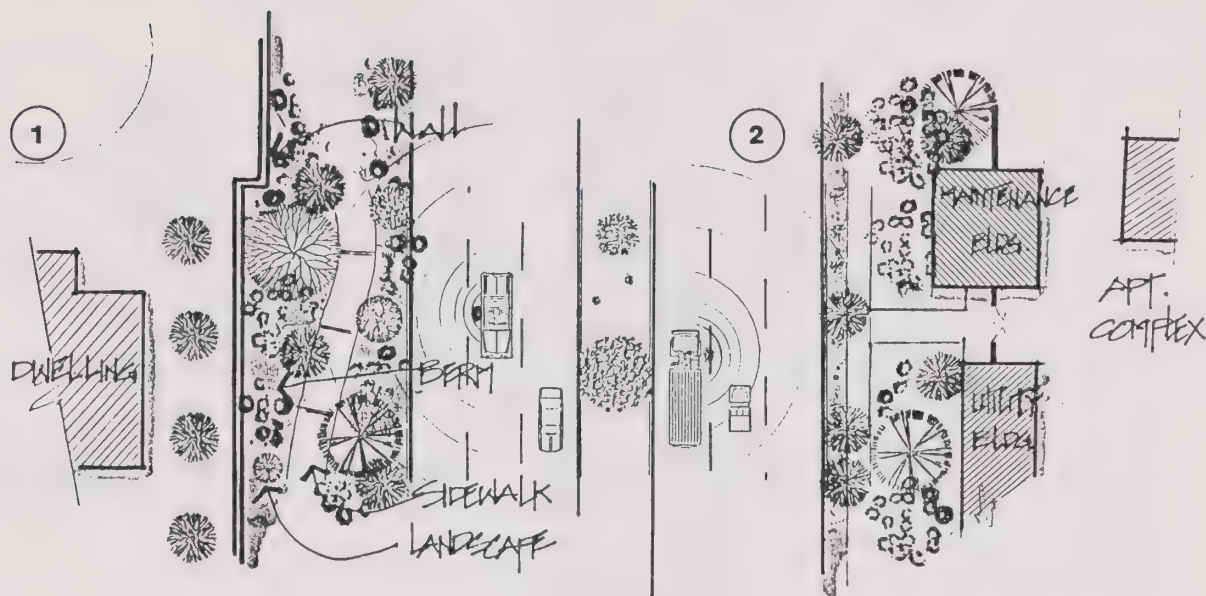


CITY OF MERCED  
PLANNING DEPT.

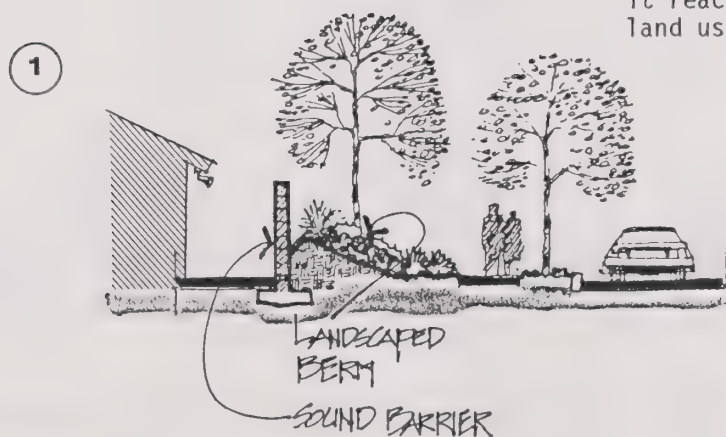


1992





- 2 Orientation of noise tolerant components between the noise source and the receptor will attenuate noise before it reaches (noise) sensitive land uses.



- 1 Combination of a wall and landscaped berm help mitigate noise. The landscaped berm also softens the visual impact of the wall.

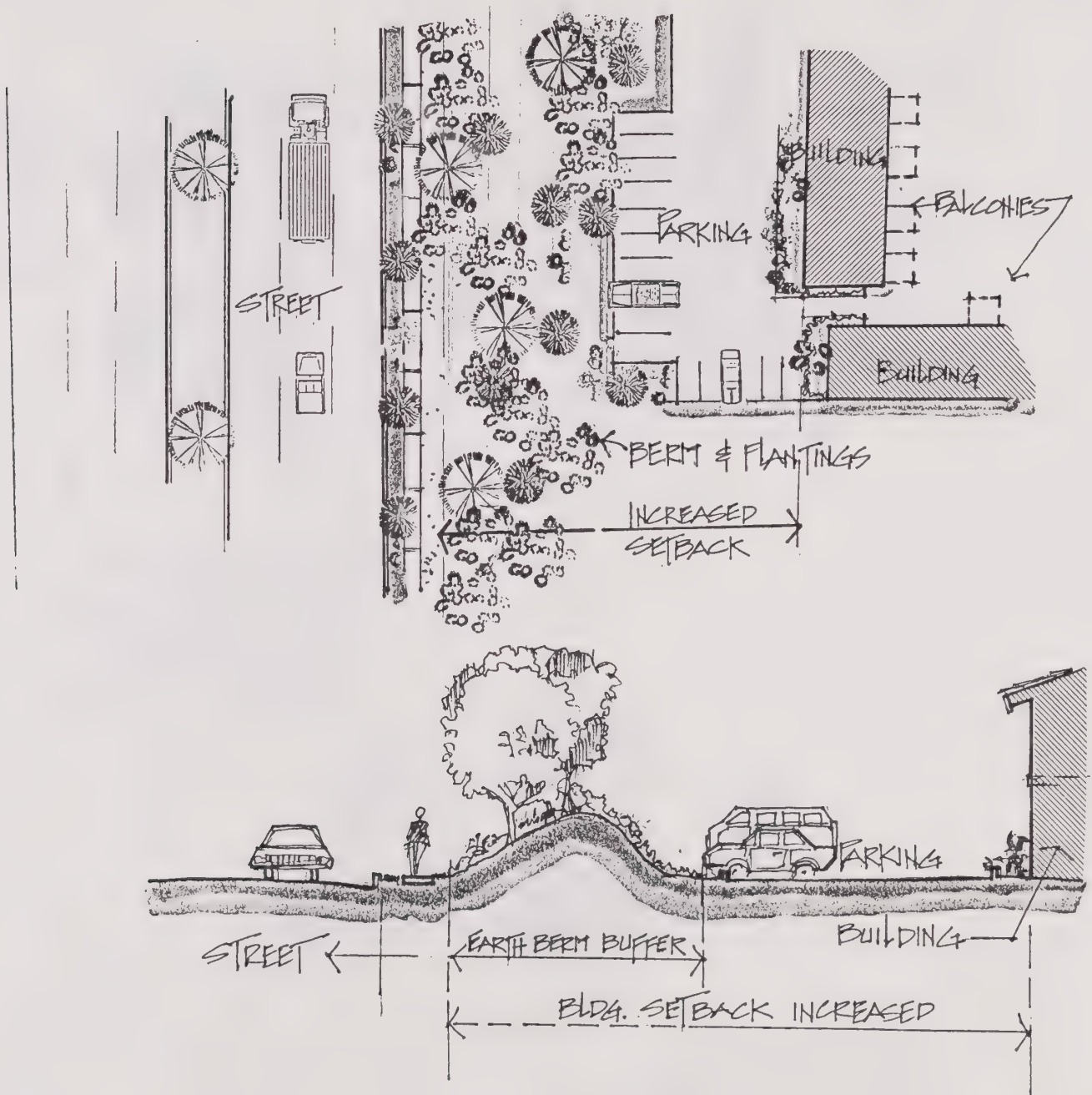
FIGURE 2a

## NOISE ABATEMENT TECHNIQUES

## NOISE ELEMENT

CITY OF MERCED  
PLANNING DEPT.

1992



Combination of an earth berm buffer and increased setbacks, location of noise tolerant uses closer to the noise source, and location of balconies, arcades, etc., towards the inside of a complex are techniques that can be used to minimize noise.

**FIGURE 2b**  
**NOISE ABATEMENT TECHNIQUES**

**NOISE ELEMENT**

CITY OF MERCED  
PLANNING DEPT.

1992

### *C. Definitions*

#### *Sound*

Sound is a mechanical form of radiant energy which is transmitted in waves through the air (or other medium) and received as vibrations on the ear drum. Sound waves are measured in terms of frequency or number of cycles per second, and in terms of amplitude or decibels.

#### *Frequency (Cycles per Second)*

Frequency or pitch is influential in determining the pleasantness of a sound. The human ear can perceive frequencies as low as 15 cycles per second (or Hertz, abr. Hz) which would be a very low rumble, and as high as 20,000 cycles per second, a very high screech. The piano ranges from a low of 28 Hz to a high of 4,186 Hz. High frequencies are more irritating to the human ear and can make a low volume noise seem noisier.

#### *Amplitude*

Decibels, the unit of measurement for amplitude, make up a logarithmic scale. Instead of increasing arithmetically, as in cycles per second, decibels increase exponentially as is characteristic with the Richter Scale used in measuring the force of an earthquake. There are several adaptations of the decibel unit of measurement that take into account the way humans react to sound. These adaptations are listed below.

#### *Decibel (A Scale) - dB(A)*

The decibel is the unit used for describing the amplitude of sound. The decibel scale is relative to the human ear, with 0 decibels being the threshold of hearing. Because the human ear's perception of sound varies with the frequency, a modified decibel scale (A Scale) has been developed which incorporates the human's greater sensitivity to high frequency sound and lower sensitivity to low frequency sound.

#### *L10*

In measuring a sound that is recurring but not maintaining a constant level, it is necessary to get a sound reading that takes into account the inconstancy of the sound. L10 measurements indicate a sound level that is being exceeded 10 percent of the total time.

#### *Day-Night Average Sound Levels (LdN)*

This method of measuring sound levels incorporates the noise from the individual events and weights them according to time of day of the event. The 24-hour day is divided into two time periods: (1) Day, 7:00 a.m. to 10:00 p.m.; and, (2) Night, 10:00 p.m. to 7:00 a.m. In order to more accurately reflect the annoyance level of the day- and night-time events, they are weighted by a multiplier of one (1) for day and ten (10) for night. Unlike the L10 method, LdN does not measure the actual noise of, for example, passing trains, but rather the average noise over a period of 24 hours. LdN or CNEL are the two descriptors to be used in Noise Elements for local compliance with the State Noise Insulation Standards.

**CNEL**

Community Noise Equivalent Level (CNEL) is similar to LdN, but with an additional adjustment for the evening hours to account for conversation, relaxation, TV viewing, etc. Along with the 10 dBA penalty for the 10:00 p.m. to 7:00 a.m. hours, 5 dBA is added to the 6:00 p.m. to 10:00 p.m. hours.

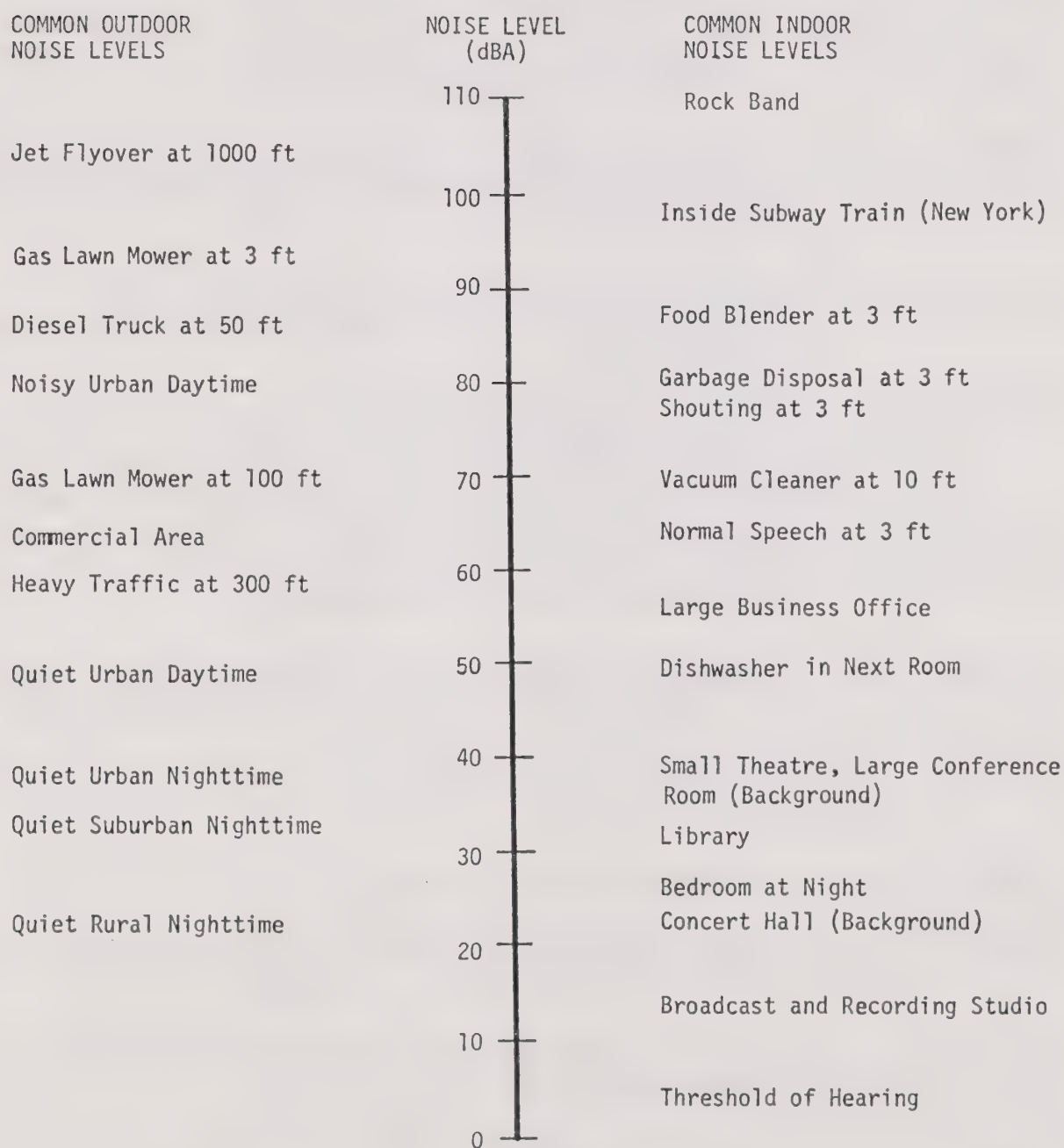
**Decibel  
Addition**

Decibels progress at a logarithmic rate. As a result, when two sounds of 90 dB(A) are produced together, the combined dB(A) reading will be 93 dB(A) and not 180 dB(A). The following chart can be used to determine the sound level of the combined sounds:

<i>When two decibel values differ by:</i>	<i>Add the following amount to the higher figure:</i>
0 - 1 dB	3 dB
2 - 3 dB	2 dB
4 - 9 dB	1 dB
10 or more dB	0 dB

The human ear, however, perceives a doubling (or halving) of loudness for every change of 10 dB(A).

Figure I

COMMON INDOOR AND OUTDOOR NOISE LEVELS(Source: City of Merced, Noise Element, 1976)

## SECTION II

### GOALS/POLICIES/ACTIONS

<b>Goal 1</b>	<b>A QUIET ENVIRONMENT</b>
<b>Policy 1</b>	<i>Minimize the Impacts of Aircraft Noise.</i>
<b>Actions</b>	<p><b>1.1.1:</b> Continue to follow the established noise abatement procedures for the Merced Municipal Airport, such as no right turn after take-off from Runway 30.</p> <p><b>1.1.2:</b> Encourage the use of noise-reducing flight procedures for large aircraft using Merced Municipal Airport, such as maintaining minimum flight altitudes.</p> <p><b>1.1.3:</b> Follow the recommendations stated in the Merced Municipal Airport (MMA) Master Plan, such as to limit industrial/commercial uses to those with peak occupancy levels of no more than 25 persons/acre in the designated Safety Zone #2 of the Airport Land Use Commission Policy Plan; and to prohibit residential land use designation within the referral area of the MMA in the Land Use Element.</p> <p><b>1.1.4:</b> Work with the Joint Powers Agency to minimize future noise impact from any proposed aircraft reuse of Castle Air Base facility.</p> <p><b>1.1.5:</b> Revise the Noise Element when a new use is in place at CAFB's facility.</p>
<b>Policy 1.2</b>	<i>Reduce Surface Vehicle Noise.</i>
<b>Actions</b>	<p><b>1.2.1:</b> Continue to discourage truck traffic and through traffic in residential areas in Merced.</p> <p><b>1.2.2:</b> Evaluate the need to prepare and adopt a Noise Ordinance for the City of Merced.</p>
<b>Policy 1.3</b>	<i>Reduce Equipment Noise Levels.</i>
<b>Actions</b>	<p><b>1.3.1:</b> Limit operating hours for noisy construction equipment used in the City of Merced.</p>

**1.3.2:** Review City functions (e.g., construction, refuse collection, street sweeping, tree trimming) to insure that noise generated by equipment has been reduced to the lowest practicable level.

**1.3.3:** Include maximum noise level permitted for City equipment purchases and construction contracts.

#### **Policy 1.4**

***Reduce Noise Levels at the Receiver Where Noise Reduction at the Source is not Possible.***

#### **Actions**

**1.4.1:** Require new residential projects (except for those located with CAFB noise-impacted areas) to meet acceptable noise level standards as follows:

- A maximum of 45 dB for interior noise level for residential projects.

- A maximum of 60 dB for exterior noise level, especially when outdoor activities are important components of a project.

- A maximum of 65 dB when all the best available noise-reduction techniques have been exhausted without achieving 60 dB, and the strict application of such a maximum becomes a hindrance to development needed or typical in an area.

- A maximum of 70 dB for rail noise when 45 dB is maintained in bedrooms and the accumulation of the total number of noisy events does not exceed 45 dB for more than 30 minutes during night-time hours (11:00 p.m. to 7:00 a.m.) and does not exceed an accumulated 60 minutes during any 24 hour period.

**1.4.2:** For CAFB noise-impacted areas, continue using the building attenuation measures for aircraft interior noise reduction consistent with the HUD - Merced Noise Agreement until CAFB closes and the HUD - Merced agreement has been revised.

**1.4.3:** Use the “normally acceptable” noise levels as established in the “Noise and Land Use Compatibility Guidelines” (Figure 6) for the review of non-residential land uses.

**1.4.4:** Evaluate the need for, and the cost of, setting up an enforcement program, including liaison with the Merced County Health Department, for assistance in on-site noise measurement.

**Goal 2:****SENSITIVE LAND USES PROTECTED FROM EXCESSIVE NOISE****Policy 2.1**

*Coordinate planning efforts so that noise-sensitive land uses are not located near major noise resources.*

**Actions**

**2.1.1:** Create a master noise contours map to be used in the review and approval process for development proposals, as well as for evaluating Circulation, Land Use, and Open Space plans to minimize noise impacts on noise-sensitive areas.

**2.1.2:** Revise and redesignate in the Land Use Element areas that are in conflict with the noise level generated in the vicinity.

**2.1.3:** Require noise barriers and/or increased setbacks between heavy circulation corridors and noise-sensitive land uses (see Figures 2a and 2b).

**2.1.4:** Require field noise measurements when new development may be impacted by high noise levels.

**Policy 2.2**

*Mitigate all significant noise impacts as a condition of project approval for sensitive land uses.*

**Actions**

**2.2.1:** Consider site design techniques as the primary means to minimize noise impacts, such as building placement, increased landscaped setbacks, orientation of noise-tolerant components (i.e., parking, utility areas, maintenance facilities) between the noise source and the receptor, use of a combination of noise barriers and landscaped berms, etc. (see Figures 2a and 2b).

**2.2.2:** Encourage developers to consider alternative architectural designs as a means of meeting noise reduction requirements, such as:

- Use noise-tolerant rooms (kitchens, garages, bathrooms) to shield other noise sensitive rooms or areas (living rooms, bedrooms).

- Locate bedrooms away from major roadways.

- For building facades, use architectural design techniques and materials that will help shield noise.

- Avoid balconies or operable windows facing major travel routes.

## SECTION III

### MAJOR SOURCES OF NOISE IN THE CITY OF MERCED

Major sources of noise in the City of Merced are cars and trucks, trains, and aircraft; other sources of noise are home appliances, tools, and construction equipment.

#### *A. Vehicular Noise*

##### *State Highway Noise Contours*

There are three State highways within the study area (Routes 99, 140, and 59). The highest vehicular noise levels are associated with Highway 99. Current noise levels range from 65 LdN to 75 LdN at 532 feet and 149 feet, respectively, from center of the highway, and future levels are projected to increase approximately 3 dB(A) LdN at the same distances.

The California State Department of Transportation (Caltrans) has developed noise contour distances showing existing noise levels along State highways and freeways. The existing measurements were derived using a traffic noise model (National Cooperative Highway Research Program #117). No on-site measurements of noise were taken. The existing noise contour values have been extrapolated down to 60 dB(A) noise level for highways adjacent to Merced Community Medical Center and East Merced Park. (See Appendix E and Figures 1a and 1b for State Highway noise contours.)

##### *Noise Contours and Method of Measurement for Major Local Streets*

LdN noise contours have been computed for Olive, Yosemite, Childs, and Parsons Avenues, "G", "M" and "R" Streets, and North Bear Creek Drive, which are considered major local streets that carry relatively heavy traffic. In 1991, Brown-Buntin Associates, Inc., noise consultants, performed the traffic noise exposure calculations for the above-mentioned streets for the City of Merced. Figures 1a and 1b show the existing and projected noise contour lines for these major local streets. Appendix E (Tables III and IV) contains the computations used for calculating noise contour lines and Table IV-A contains the existing and projected noise contours for Parsons Avenue.

#### *B. Noise Contours and Method of Measurement for Rail Traffic*

Two rail lines run through the City of Merced — the Southern Pacific (SPTC) and the Atchison, Topeka, and Santa Fe (AT& SF).

In measuring the noise levels of rail traffic there must be some indication of train frequency and time of passage. The day-night average sound level

method does this by incorporating the noise from the individual events and weighting them according to time of day of the event. A train passing between the hours of 7:00 a.m. and 10:00 p.m. is multiplied by a factor of one, while a train passing between the hours of 10:00 p.m. and 7:00 a.m. is multiplied by a factor of 10. This widely-used method more accurately reflects the annoyance level of the rail traffic.

*Southern Pacific  
Transportation  
Company (SPTC)  
Railroad*

Mainline operations for 1992 on the SPTC Railroad in the City of Merced consists of about 20 freight trains per day. Passenger trains presently do not operate on SPTC tracks. Estimates of future operations were not available from the railroad. Maximum train speed is generally 65 MPH, and train movements may occur at any time during the day or night.

Using the Wyle Methodology for the previously described type and frequency of operations, noise exposures of 65 and 60 dB(A) LdN occur at approximately 335 and 630 feet, respectively, from the center of the tracks. Noise levels are somewhat higher in the vicinity of grade crossings because of the use of the warning horn (see Figure 1a and Table 1).

*Atchison, Topeka  
and Santa Fe  
(AT&SF)  
Railroad*

Mainline operations for 1992 on the AT&SF Railroad in the City of Merced consist of an average of 22 freight and 6 passenger trains per day. Estimates of future operations were not available from the railroad, although Amtrak is proposing to add 2 more daily passenger trains along this line. Maximum speed is 70 MPH for freight trains, which may pass at any time during the day or night. Passenger trains generally operate during daytime (7:00 a.m. to 8:15 p.m.) hours, and maximum speed is 79 MPH. This type and frequency of operations will result in noise exposures of 65 and 60 dB(A) LdN at approximately 345 and 650 feet, respectively, from the center of the tracks (according to the Wyle Methodology). In the area surrounding grade crossings, noise levels are somewhat higher than this due to the use of the warning horn (see Figure 1a and Table 1).

Data on future rail traffic was not available. However, according to the Wyle Methodology, a hypothetical 15 percent increase in operations would place the 65 and 60 dBA LdN contour lines at 360 and 675 feet for the Southern Pacific Railroad, and at 375 and 700 feet for the Santa Fe Railroad (see Table 2).

*C. Noise Contours and Method of Measurement for Aircraft Traffic*

The City of Merced is impacted by the noise from two airports: Castle Air Force Base and Merced Municipal Airport.

TABLE 1: DISTANCE TO NOISE CONTOUR LINES FOR RAILROADS

<b>RAILROAD</b>	<i>Distance from center of tracks to contour line (in feet)</i>	
	<b>65LdN</b>	<b>60LdN</b>
<b>Southern Pacific Transportation Co. (SPTC)</b>	<b>335'</b>	<b>630'</b>
<b>Atchison, Topeka &amp; Santa Fe (AT&amp;SF)</b>	<b>345'</b>	<b>650'</b>

TABLE 2: DISTANCE TO NOISE CONTOUR LINES FOR RAILROADS WITH A HYPOTHETICAL 15% INCREASE IN OPERATIONS

<b>RAILROAD</b>	<i>Distance from center of tracks to contour line (in feet) with a hypothetical increase of 15% in operations.</i>	
	<b>65LdN</b>	<b>60LdN</b>
<b>Southern Pacific Transportation Co. (SPTC)</b>	<b>360'</b>	<b>675'</b>
<b>Atchison, Topeka &amp; Santa Fe (AT&amp;SF)</b>	<b>375'</b>	<b>700'</b>

*Merced County  
Airport Land Use  
Commission Policy  
Plan (ALUC)*

The Merced County Airport Land Use Commission (ALUC), in an effort to assure continued compatibility of land uses in areas affected by airport activities, adopted a policy plan. For each public-use airport in Merced County, a land use plan and supporting policy guidance were defined. The ALUC Policy Plan also designates three safety zones within the referral area and their corresponding compatible land uses. The plan specifies areas of great concern, including height restrictions, safety, and noise. The main objective for airport noise policy, as stated in the Merced County ALUC Policy Plan, is to assure that new land uses in airport environs are compatible with aircraft-generated noise. To this end, the Policy Plan establishes 65 db CNEL as the criteria for residential uses and is based upon an assumed noise level reduction of 20 decibels (db) for an average normal residence. Several amendments to the ALUC Policy Plan are recommended in the Merced Municipal Airport Master Plan (December 1990). These recommendations are included as part of the Goals, Policies, and Actions section of the Noise Element.

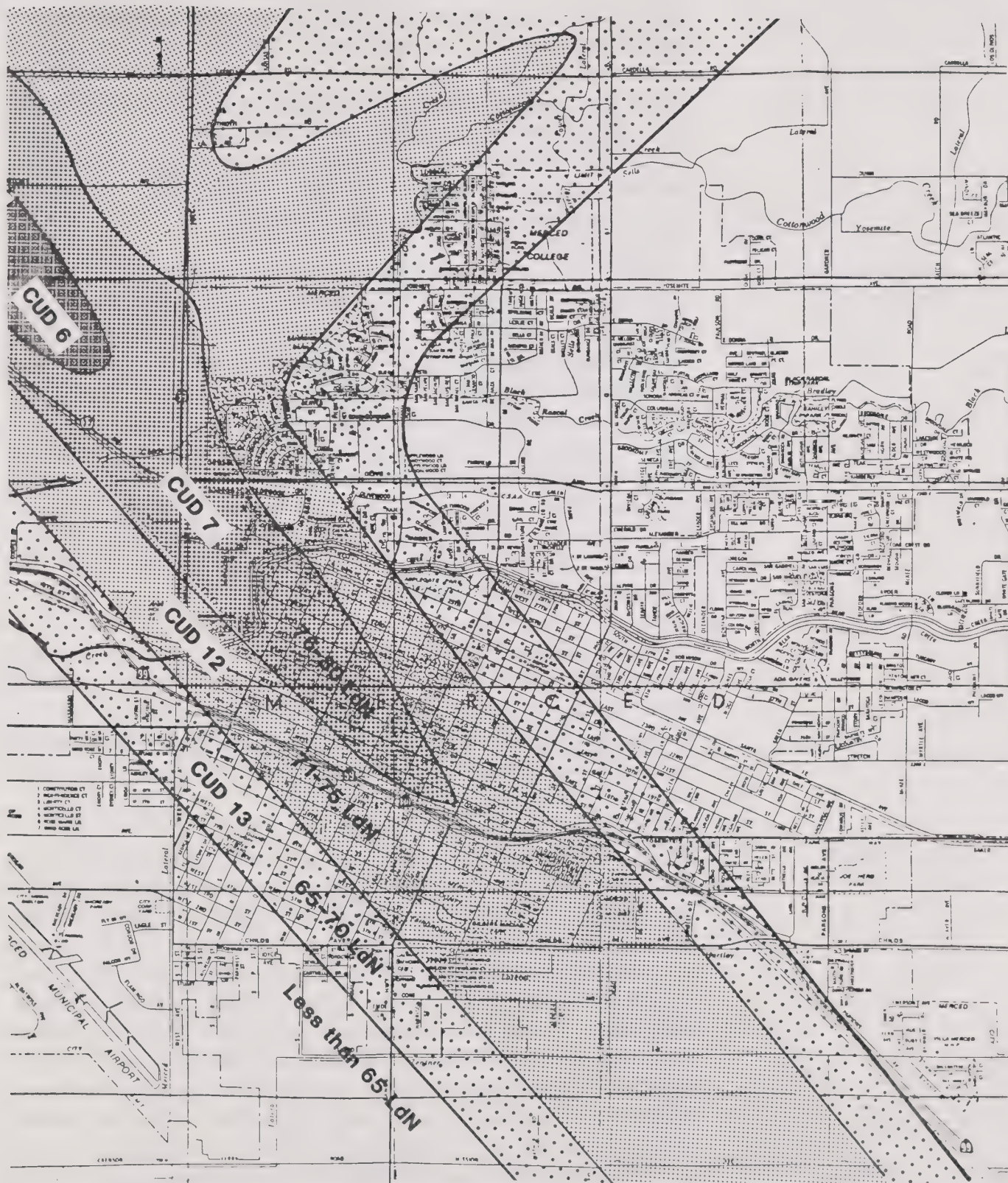
*Castle Air Force  
Base (CAFB)*

Castle Air Force Base consists of approximately 2,787 acres of land owned in fee and 480 acres of easements. The base is scheduled to close in 1995, but some future aircraft reuse of the facility is anticipated. The base (CAFB) is located outside the City of Merced, approximately four miles northwest of the City. The base supports 18 military tenants, three of them having primary missions, and contains 23 aircraft and two KC-135 squadrons, for a total of 38 aircraft. Approximately 2,500 students are trained annually, and over 800 students are in residence at any given time. The highest noise levels in Merced are associated with aircraft from Castle.

*Noise Contours  
and Method of  
Measurement for  
Castle Air Force  
Base*

Noise contours for military airports are based on average busy-day activities, both existing and future, and based on the assumption that future military aircraft will not be any noisier than existing aircraft. The noise contours are also based on existing peace-time activities. Therefore, military conflict or special circumstances could result in a major increase in aircraft activity and noise for such events. Figure 3 shows noise contours and Compatible Use Districts (CUD's) for CAFB. Castle Airport is one of the military airports scheduled to be closed by 1995 as a result of military spending cuts. At present, there is a study underway to consider the reuse of the CAFB facility, but until such time when a specific use has been selected, existing noise contours will be used. An update of this section is expected to take place once specific data on the re-use plan becomes available.

The noise standards established in the California Administrative Code, Title 21, Subchapter 6, designate Community Noise Equivalency Level (CNEL) as the noise rating method to be used at California airports. The



**FIGURE 3**  
**CASTLE AFB COMPATIBLE USE DISTRICTS**  
**AND NOISE CONTOURS**

	CUD 13		CUD 7
	CUD 12		CUD 6

**NOISE ELEMENT**

CITY OF MATH  
 PLANNING DEPT



1992

noise descriptor used by the Air Force, and published as a part of the Air Installation Compatible Use Zone (AICUZ) report, is the LdN method. This is similar to the CNEL method; the two descriptors are generally within one dB of one another, and both can be used for noise contours for local compliance with the State Noise Insulation Standards. These standards require specified levels of outdoor to indoor noise reduction for new multi-family residential construction in areas where the outdoor noise exposure exceeds CNEL (or LdN) 60 dB.

*Compatible Use  
Districts*

The Air Force has published an AICUZ report for CAFB (October 1987), which uses Compatible Use Districts (CUD's) as the basis for land use recommendations, for use as a guideline for local decision makers. Table 3 shows the Compatible Use Districts and the area within each CUD by jurisdiction. It can be observed that CUD's Nos. 7, 12 and 13 have a total of 3,825.4 acres falling within the City of Merced. CUD's 6, 7, 12, and 13 have a total of 4,492 acres outside the City limits, but within the Merced Specific Urban Development Plan (SUDP). Figure 3 presents the previously mentioned CUD's, and Table 4 gives an estimated total of residents within those areas that are considered to be impacted by the noise from CAFB aircraft: 21,617 people within City Limits and 1,355 outside City limits, but within the Merced SUDP.

The noise generated by the Merced Municipal Airport appears to only slightly affect the current noise contours for CAFB traffic. That fact might change once Castle Airport has been closed and a new use is in place at the site. As previously mentioned, a further evaluation and update of this element is expected to happen once the changes have taken place.

*HUD - Merced  
Noise Agreement*

The U. S. Department of Housing and Urban Development (HUD) has developed land use policies for application in noise-impacted areas. In 1984, a HUD - Merced noise agreement was executed and is currently being reviewed and revised to reflect current conditions. The above-mentioned agreement was based on a report prepared by HUD pursuant to Code 24 of Federal Regulations, Part 51.106 (a)(4) relating to the area-wide data and HUD noise policies and regulations. Both the City and HUD recognized the unique circumstances in Merced revealed by the report and adopted the noise attenuation measures recommended by the report. All development in areas where the outdoor noise level exceeds 65 LdN must either comply with the attenuation measures recommended by HUD's report or submit independent attenuation standards, reviewable by HUD that reduce interior noise to 45 LdN or below. The agreement will be used for evaluating projects on CAFB noise-impacted areas until CAFB has been closed and the HUD - Merced Agreement has been revised.

TABLE 3: AREA WITHIN EACH CUD (Compatible Use District)

## Area in Acres

CUD	Atwater City	Atwater SUDP	Merced City	Merced SUDP	Franklin Beachwood SUDP	Winton SUDP	County	Total
1							413.3	413.3
2							688.8	688.8
<b>6</b>				69.1	36.9		3933.4	4039.4
<b>7</b>	20.2		571.7	304.9	139.8		7188.6	8225.2
8					64.1		876.3	940.4
9					9.3		14.4	23.7
<b>12</b>	134.7	25.3	1665.3	1359.8	303.9	97.1	19304	22890.1
<b>13</b>	338.8	85.4	1588.4	2758.2	343.1	313.3	31098.2	36525.4
Total	493.7	110.7	<b>3825.4</b>	<b>4492</b>	897.1	410.4	63517	73746.3

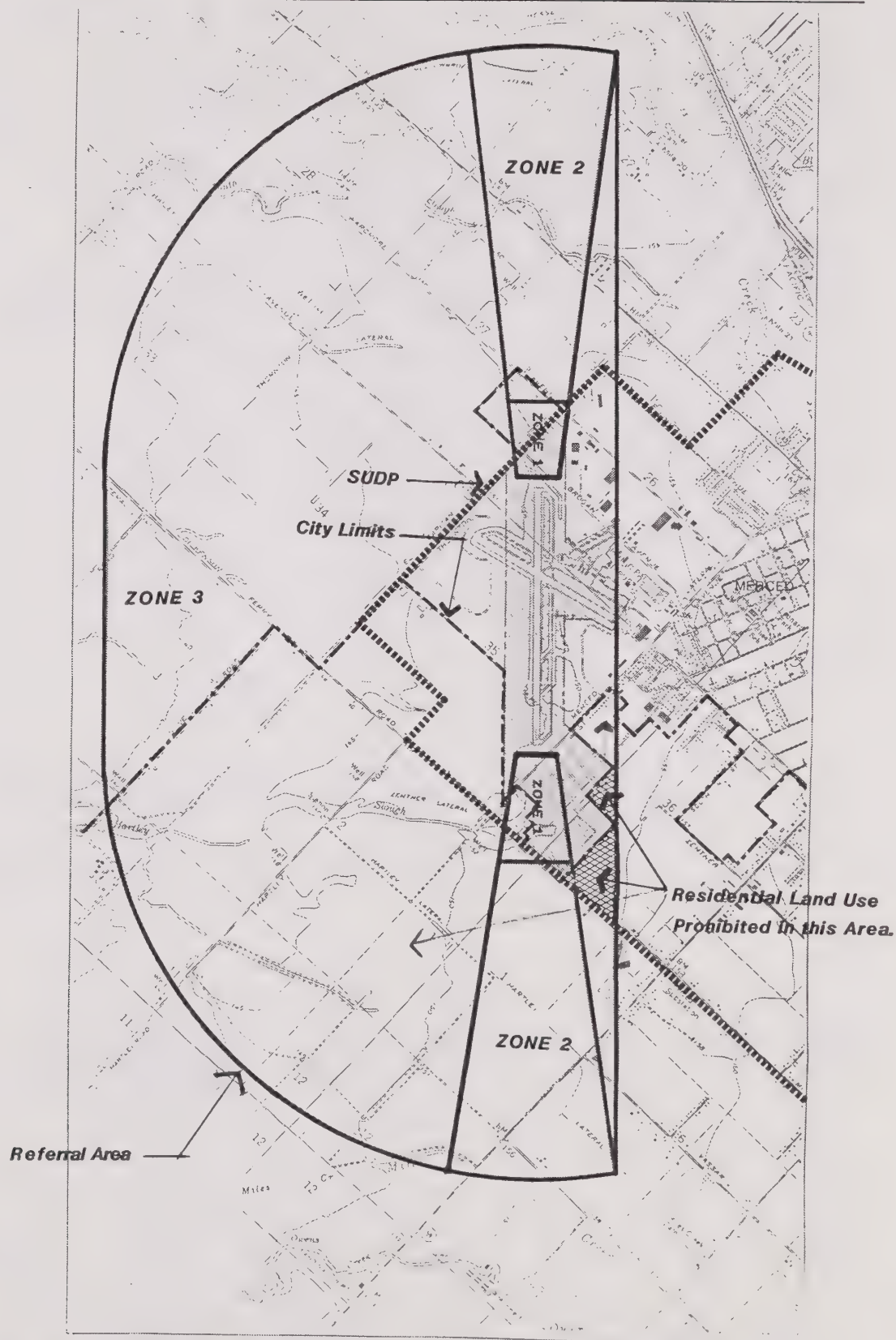
Source: Castle Air Force Base, Comprehensive Land Use Plan, 1989.

TABLE 4: POPULATION WITHIN EACH CUD (Compatible Use District)

## Population

CUD	Atwater City	Atwater SUDP	Merced City	Merced SUDP	Franklin Beachwood SUDP	Winton SUDP	County	Total
1							79	79
2							381	381
<b>6</b>				13	0		1930	1943
<b>7</b>	0		1589	57	187		3750	5583
8					15		956	971
9					0		719	719
<b>12</b>	426	2	9786	553	515	133	3072	14487
<b>13</b>	3380	11	10242	732	896	2090	9140	26491
Total	3806	13	<b>21617</b>	<b>1355</b>	1613	2223	20027	50654

Source: Castle Air Force Base, Comprehensive Land Use Plan, 1989.



**FIGURE 4**  
**MERCED MUNICIPAL AIRPORT SAFETY ZONES**

- Airport Property
- Referral Area Boundaries

**NOISE ELEMENT**

0 2000 4000 FT.

CITY OF MERCED  
PLANNING DEPT.



1992

The noise contours for Castle Air Force Base (CAFB) were mapped by the Merced County Association of Government (MCAG) and appear on a map dated 1991, which is part of the Comprehensive Land Use Plan for CAFB adopted in March 1989, and since then a component of the 1978 Airport Land Use Compatibility (ALUC) policy plan.

*Noise Contours  
and Method of  
Measurement for  
Merced Municipal  
Airport*

Merced Municipal Airport (MMA) is located on the southwest section of the City. As of 1990, the number of based aircraft was 94. Annual operations is estimated to be 55,000, while the runway capacity is calculated to be approximately 135,000 operations. By the year 2010, an approximate 85,000 operations are forecasted with an increase to approximately 150 aircraft. The referral area adopted for Merced Municipal Airport extends 10,000 feet beyond where the runway ends. This referral area encompasses portions of the City of Merced to the east, and agricultural areas (within the County of Merced) to the west. Figure 4 shows the Merced Municipal Airport's referral area and safety zones.

The noise model input data used to calculate the noise contours for Merced Municipal Airport are provided in Appendix E. Figures 1a and 1b show existing and projected noise contours around the Merced Municipal Airport. Noise from MMA affects only the immediate area surrounding the airport, which is mainly agricultural and industrial.

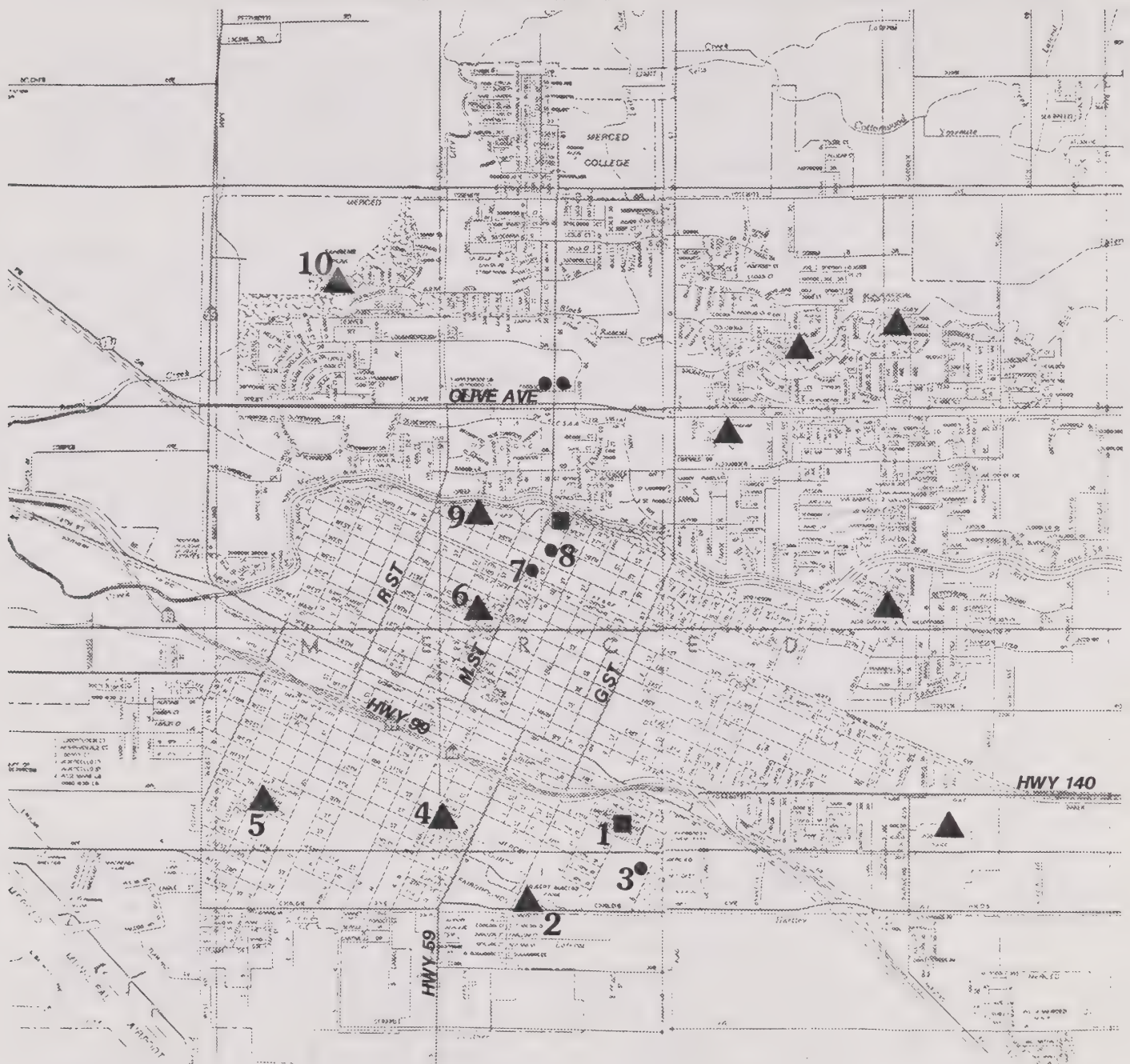
*D. Other Sources of Noise*

Other sources of noise include home appliances, tools, construction equipment, and others. The discussion on home appliances is limited since the City is not able to control noise input in the home. They are mentioned in order to give a better understanding of the nature of noise. Construction equipment is better controlled, although its transient nature makes it appear to be less severe and intrusive.

Because construction noises are temporary, there has not been a concerted effort to reduce the noise levels of the equipment involved. As the City expands and as the older areas are renewed and rehabilitated, the noise from construction will be more noticeable.

*E. Noise Sensitive Land Uses*

Existing land uses located within the City of Merced that are sensitive to intrusive noise include hospitals, convalescent care facilities, parks, residential areas, schools, and libraries. Figure 5 shows the locations and LdN values at some of these sensitive land uses within the City of Merced. Some variability in standards for noise sensitivity may apply to different densities of residential development, and single-family uses are fre-



	LAND USE	Ldn	SOURCE
1	MERCED COMMUNITY MEDICAL CENTER	65/70	HWY 99/CAFB
2	MACIAS PARK	70	CAFB
3	MERCED MANOR CONV. HOSPITAL	70	CAFB
4	MCMAMARA PARK	70	CAFB
5	STEPHEN LEONARD PARK	65	CAFB

	LAND USE	Ldn	SOURCE
6	COURT HOUSE SQ. PARK	70	CAFB
7	LA SIERRA CONV. HOSPITAL	65	AT&SF RR
8	MERCED CONV. HOSPITAL	65	CAFB
9	APPLEGATE PARK	65	CAFB
10	FAHRENS PARK	70	CAFB

LAND USES NOT SHOWN IN NUMBERS ARE LOCATED IN BELOW 60 Ldn ZONE.

**FIGURE 5**

**SENSITIVE LAND USES**

- HOSPITAL
- CONVALESCENT HOSPITAL
- ▲ PARK

**NOISE ELEMENT**

0 1/4 1/2 1  
miles



CITY OF MERCED  
PLANNING DEPT.

1992

quently considered the most sensitive. There is a range of land uses that are relatively insensitive to noise such as commercial, retail, industrial, salvage yards, transit terminals, and others.

Residential areas in Merced are located along almost every major arterial, and therefore experience significant motor vehicle generated noise levels. Many of the newer residential subdivisions provide adequate sound barriers and may not be impacted by arterial noise. If a residence has direct vehicular access from the roadway, or if the housing tract was not built with protective noise barriers, the noise exposure in these areas would be considered excessive.

*Guidelines for  
Land Use  
Compatibility*

The State Office of Noise Control has developed a noise/land use compatibility matrix for noise standards for different land use categories. Depending on the environment of a particular community, these basic guidelines may be tailored to reflect the existing noise and land use characteristics of that particular community.

As stated earlier, the City of Merced uses the guidelines for CAFB noise levels in accordance with the HUD - Merced noise agreement. Areas with less than 65 LdN are classified as clearly acceptable, whereas in 65 or higher noise levels different dB reductions are required.

Due to the future closure of the air base, the following considerations, along with the guidelines for land use compatibility shown in Figure 6, should be taken into account when evaluating proposed development:

1. A maximum outdoor noise level of 60 LdN in residential areas where outdoor use is a major consideration, and whenever the realm of economic or aesthetic consideration makes it possible; a maximum of 65 LdN in any other case.
2. The indoor noise level as required by the State of California Noise Insulation Standards must not exceed 45 LdN in multi-family dwellings. This maximum should also be used for single-family homes.
3. If the noise source is a railroad, then 70 LdN as the maximum outdoor noise level should be considered as long as a maximum of 45 dBA indoor level in bedrooms is maintained. This is because train noise is usually characterized by relatively few loud events in which the majority of the time the noise levels will be acceptable for speech communication; the 45 dBA indoor level requirement should be implemented especially if there are trains passing by between 10:00 p.m. and 7:00 a.m., however.

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE Ldn or CNEL, db					
	55	60	65	70	75	80
RESIDENTIAL						
TRANSIENT LODGING - MOTEL, HOTELS						
SCHOOLS, LIBRARIES, CHURCHES, HOSPITALS, NURSING HOMES						
AUDITORIUMS, CONCERT HALLS, AMPHITHEATERS						
SPORTS ARENA, OUTDOOR SPECTATOR SPORTS						
PLAYGROUNDS, NEIGHBORHOOD PARKS						
GOLF COURSES, RIDING STABLES, WATER REC., CEMETERIES						
OFFICE, BUSINESS, COMMERCIAL & PROFESSIONAL						
INDUSTRIAL, MANUFACT., UTILITIES, AGRICULTURE						

**Normally Acceptable**

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

**Conditionally Acceptable**

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

**Normally Unacceptable**

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

**Clearly Unacceptable**

New construction or development should generally not be undertaken.

SOURCE: ADAPTED FROM THE STATE OF CALIFORNIA GENERAL PLAN GUIDELINES, 1990. OFFICE OF PLANNING AND RESEARCH. SUGGESTED CNEL/LDN METRICS FOR EVALUATING LAND USE NOISE COMPATIBILITY.

**FIGURE 6**  
**NOISE COMPATIBILITY GUIDELINES**

NOISE ELEMENT

CITY OF MERCED  
PLANNING DEPT.

1992

*Truck Routes*

Truck routes have been identified within the City to direct large trucks onto roadways designed for that purpose. Truck routes direct trucks through the City to a destination outside Merced. These roadways are not designed for delivery trucks which need to reach specific destinations within the City.

Traffic noise generation is highly sensitive to the number of trucks as a percentage of the total vehicles using the roadway on a daily basis. By designating truck routes where it will be less disruptive for sensitive land uses, the City is avoiding noise conflicts with adjacent land uses. Figure 7 shows the City of Merced's truck routes which are basically along busy streets of mainly commercial areas or along streets with little development. Proposed land uses next to these designated truck routes where development has not occurred will need to be compatible with the noise generated along these streets.

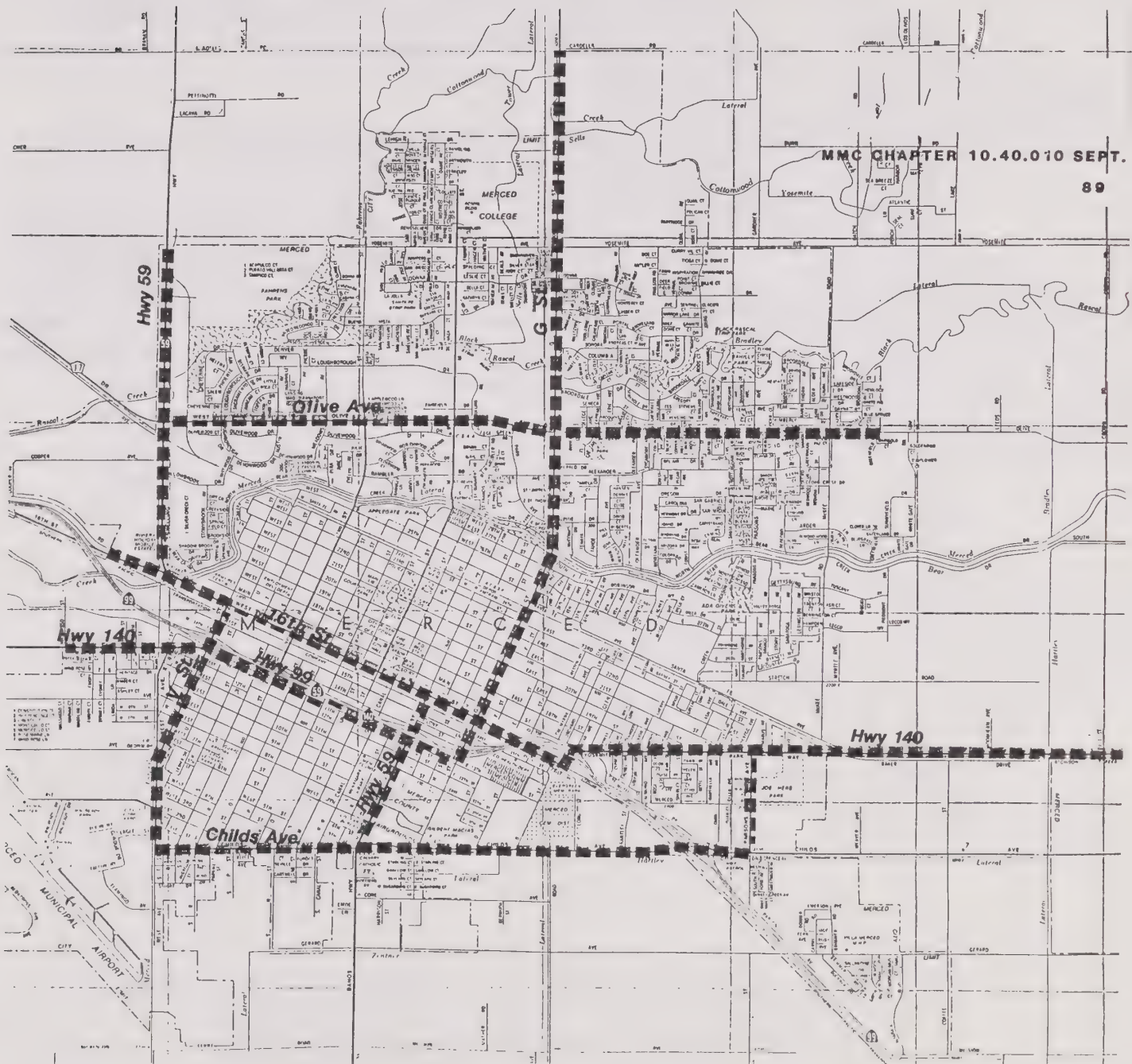


FIGURE 7

CITY OF MERCED TRUCK ROUTES

■■■■■■ TRUCK ROUTE

NOISE ELEMENT



CITY OF MERCED  
PLANNING DEPT.

1992

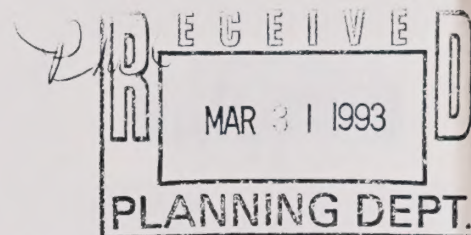
## BIBLIOGRAPHY

1. Castle Air Force Base, *Comprehensive Land Use Plan*, March 1989.
2. City of Merced, Environmental Resources Management Plan, *Noise*, 1976.
3. \_\_\_\_\_, Merced Municipal Airport Master Plan Report, 1990.
4. Merced County General Plan, 1990, Noise Element.
5. State of California Department of Transportation, *Noise Technical Analysis Notes*, March 1991, Second Draft.
6. U.S. Department of Housing and Urban Development, Office of Community Planning and Development, *The Noise Guidebook*, March 1985.

### Telephone Calls:

1. Dave Detjen, Santa Fe Railroad, Topeka, Kansas, telephone call, March 1992.
2. Ron Pang, Southern Pacific Railroad, telephone call, March 1992.
3. Amtrak Representative, Amtrak, Merced Office, telephone call, May 1992.
4. Von P. Fuertes and Rudy Hendriks, Caltrans District 10, telephone calls and correspondence, April and August 1992.





RESOLUTION NO. 93-29

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF  
MERCED AMENDING THE NOISE ELEMENT OF THE GENERAL  
PLAN

THE CITY COUNCIL OF THE CITY OF MERCED DOES HEREBY RESOLVE AS  
FOLLOWS:

SECTION 1. Having been considered by the City Council  
following a public hearing on March 15, 1993, the Noise Element of  
the General Plan of the City of Merced is hereby amended to read as  
set forth in Exhibit A attached hereto and incorporated herein by  
reference.

SECTION 2. The City Clerk is hereby directed to endorse upon  
the General Plan of the City of Merced the above revision and the  
date of this resolution.

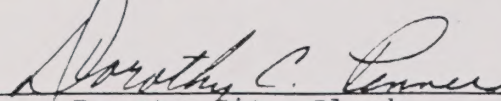
PASSED AND ADOPTED by the City Council of the City of Merced  
at a regular meeting held on the 15th day of March, 1993, by the  
following called vote:

AYES: Council Members: KNUDSEN, HASSETT, DIAS, BERNASCONI,  
NOES: Council Members: BERGMAN  
ABSTAIN: Council Members: NONE  
ABSENT: Council Members: LINDSEY, (ONE VACANCY)

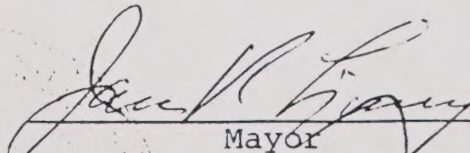
ATTEST:

JAMES G. MARSHALL, CITY CLERK

BY:

  
(Deputy City Clerk)

APPROVED:

  
Mayor

(SEAL)

RESGNPLNNE



U.C. BERKELEY LIBRARIES



C124907847

